

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. LXXIX, No. 1

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

I

NEW REPTILES AND AMPHIBIANS FROM EAST AFRICA

BY ARTHUR LOVERIDGE

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

FEBRUARY, 1935

No. 1.—*Scientific Results of an Expedition to Rain Forest Regions
in Eastern Africa*

I

New Reptiles and Amphibians from East Africa

BY ARTHUR LOVERIDGE

During 1933 and 1934, as a fellow of the John Simon Guggenheim Foundation, I was given the opportunity of investigating on behalf of the Museum of Comparative Zoölogy, the herpetological fauna of certain remnants of rain forest in East Africa. It is proposed to publish a series of reports dealing with the material which was collected incidental to the investigation. Certain of the specimens, however, were recognized in the field as being undescribed forms, two others were subsequently differentiated; it appears advisable to publish descriptions of these without further delay.

Full information as to altitudes, and other data concerning the type localities, will be published later in the Introduction to the reports. In the report dealing with Herpetology, more precise notes will be furnished as to the habitat, food, etc., of these new species.

Fortunately with only three exceptions, adequate series were obtained of all the new things described below. The actual numbers taken or utilized in the descriptions, together with the type localities, are as follows:

- 28 *Testudo pardalis babcocki* subsp. nov. Mount Debasien, Karamoja, Uganda.
- 1 *Typhlops kaimosae* sp. nov. Kaimosi, Kakamega, Nyanza Province, K. C.
- 62 *Natrix olivacea uluguruensis* subsp. nov. Nyange, Uluguru Mtns., T. T.
- 1 *Natrix olivacea pembana* subsp. nov. Pemba Island, Tanganyika Territory.
- 4 *Coronella semiornata fuscrosea* subsp. nov. foot of Mt. Mbololo, K. C.
- 6 *Aparallactus turneri* sp. nov. Sokoki Forest, near Malindi, K. C.
- 19 *Agama agama kaimosae* subsp. nov. near Kaimosi, Kakamega, K. C.
- 20 *Riopa tanae* sp. nov. Kau, near the mouth of the Tana River, K. C.
- 11 *Riopa mabuiiformis* sp. nov. Ngatana on the Tana River, K. C.
- 44 *Acontias percivali* sp. nov. foot of Mount Mbololo, Taita, K. C.
- 52 *Chamaeleon bitaeniatus altaeelsonis* subsp. nov. Kaburomi, 10,500 feet, Mt. Elgon, Uganda.
- 30 *Boulengerula taitanus* sp. nov. Mt. Mbololo at 4,800 feet, K. C.
- 3 *Arthroleptides dutoiti* sp. nov. Koitobos River, Mount Elgon, K. C.
- 75 *Hyperolius milnei* sp. nov. Witu, Coast Province, Kenya Colony.

The last is named in appreciation of the generous hospitality of Mr. R. D. Milne, who was not only my host but assisted me in hunting frogs during the five days which I spent near Witu.

The Arthroleptides is named after its discoverer, Dr. A. C. du Toit of Cape Town University, who visited the eastern slopes of the mountain when I was on the western. The occurrence on Mount Elgon of a member of this hitherto monotypic genus is of extraordinary interest and significance.

TESTUDO PARDALIS BABCOCKI subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,003. An adult ♀ from the western slopes of Mount Debasien, Karamoja, Uganda at 5,500 feet, collected by Arthur Loveridge, November 23, 1933.

Paratypes. Thirteen specimens in the Museum of Comparative Zoölogy from the following localities: **Kenya Colony:** Guaso Nyiro River; Meru River; Ithanga Hills; Wema, Tana River; Mount Mbololo, Taita. **Tanganyika Territory:** Arusha; Saranda; Pwaga; Tukuyu. **South Africa:** three without definite locality.

Fourteen specimens in the British Museum (N.H.) from the following localities: **Sudan:** Bahr el Gebel. **Uganda:** Mount Elgon between 9,000 and 10,000 feet. **Kenya Colony:** Ndogo, Lake Baringo. **Tanganyika Territory:** Mgana; "East Central Africa (Speke coll.)." **Mashonaland:** Mount Darwin. **Bechuanaland:** Magalapsi. **South Africa:** Algoa Bay; and five without definite locality.

Diagnosis. The southeast and east African Leopard Tortoise has long been confused with the typical form which was described by Bell as from "Promont. Bonae Spei." Fortunately Bell gave the length and depth of the type which places it within the range of the low-shelled form inhabiting southwest Africa. What was probably the type specimen, (which should be in the Zoölogical Museum, Cambridge, England,) was beautifully figured by Sowerby and Lear (1872, *Tortoises, Terrapins, and Turtles*, p. 3, pls. ix and x). Seven examples of the typical form and twenty-eight of the new form have been utilized in assessing the ranges of variation of the two forms.

Carapace high, the greatest height of shell being included in its greatest length from 1.61 to 2.07 times.

(South, East and Central Africa to the Bahr el Gebel). *T. p. babcocki*

Carapace low, the greatest height of shell being included in the greatest length from 2.02 to 2.62 times.

(Southwest Africa Protectorate and probably Cape Peninsula, as type locality is given as Cape of Good Hope) *T. p. pardalis*

It should perhaps be mentioned that only 2 of the 28 examples of the new form are shallower than 1.94 times. Both of these are British Museum measurements based on an adult (453 mm.) from Ndogo, Lake Baringo, Kenya Colony (2.00 times), and a juvenile (54 mm.) from Mgana, Tanganyika Territory (2.07 times); this last locality I have failed to locate on the maps available.

The average of height into length is 1.81 for the 28 examples of the new form as against 2.18 times for 7 specimens referred to typical *pardalis*. As, however, 4 of the latter are British Museum material with only "South Africa" for data they are somewhat arbitrarily assumed to be of the typical race.

Remarks. Ten years ago when I first saw two examples (adult of 302 mm., and young of 55 mm. long) of the Leopard Tortoise from Kolmanskop and Aroab in the Southwest Protectorate I was struck by the low vaulted shell as compared with that of the reptile with which I was familiar in East Africa. They form a parallel to *Kinixys belliana* of the savannah and the depressed *K. spekii* of the more arid districts.

Through the exceeding kindness of Mr. H. W. Parker, who has furnished me with detailed measurements and other particulars of all the Leopard Tortoises in the British Museum, I have become convinced that the high-vaulted type merits subspecific distinction and in designating it I am glad to associate the name of my friend Dr. Harold L. Babcock, author of "The Turtles of New England" and Curator of Reptiles in the Museum of the Boston Society of Natural History.

TYPHLOPS KAIMOSAE sp. nov.

Type. Museum of Comparative Zoölogy, No. 40,060 from Kaimosi Forest, near Friends' Africa Mission, Kakamega district, Nyanza Province, Kenya Colony, collected by Arthur Loveridge, March 7, 1934.

Diagnosis. Differs from *T. p. punctatus* and all other East African members of the genus *Typhlops* in possessing an ocular which is broadly in contact with the nasal shield *below* the preocular, thus separating the latter shield from the upper labials; no subocular as is present in *T. p. gierrai*.

Differs from *T. praeocularis* Stejneger of Leopoldville, Belgian Congo in the possession of 28 (instead of 24-26) midbody scale-rows; diameter of body being included in total length 43 (instead of 67) times; rounded snout (instead of with sharp cutting edge); habit; coloration.

Description. Snout prominent, rounded, without obtuse horizontal keel; nostrils inferior; rostral large, more than half the width of head, extending almost to the level of the eyes, which are distinguishable; nasal semidivided, the suture extending from the first labial to the nostril; preocular present, narrower than the nasal, not more than half as broad as the ocular which is in contact with the nasal below the preocular so as to broadly separate the preocular from the labials; ocular in contact with the third and fourth labials; four upper labials. Diameter of body 43 times in the total length; tail broader than long, ending in a spine. Midbody scale-rows 28.

Coloration. Above, uniformly black. Below, scarcely lighter than above except around the mouth and anus.

Measurements. Total length 215 mm.; head and body 211 mm.; tail 4 mm.; diameter at midbody 5 mm.

NATRIX OLIVACEA and its races

In 1925, and again in 1928, I drew attention to the fact that for the past forty years the common and widely-distributed Olive Water Snake was believed to possess invariably 19 longitudinal scale-rows at midbody. It is true that Fischer (1884, *Jahr. Hamb. Wiss. Anst.*, **1**, p. 6) recorded an individual with 17 scale-rows from Masailand. Boulenger (1893, *Cat. Snakes Brit. Mus.*, **1**, p. 227), possibly thinking it a case of misidentification, omitted this record from his synonymy so that it has passed into oblivion.

In the forested mountains of the Usambara, Uluguru and Rungwe there occurs a race with 17 scale-rows at midbody. Of sixty-three snakes collected by me in these mountains, no less than 89% possessed 17 scale-rows, the rest 18 or 19 except for one with 16. When reporting on some of these in 1928, Dr. Barbour and I refrained from describing this race until the opportunity occurred for securing an adequate series of the typical form (which was described from Tete, Mozambique) from the coast and savannah regions round about.

That opportunity occurred during my visit to East Africa last year, and I have been able now to assemble 94 specimens of the typical form, or their data, from all parts of the range. Omitting Fischer's record, as Masailand was a vague term applied to the country over which the Masai roamed and embracing several mountains, in all these 94 snakes only one (M. C. Z. 30,074 from Albertville, Belgian Congo) had 17 scale-rows while three from the Tana River had 18 (though these displayed 19 slightly in advance of mathematical

midbody). I propose, therefore, to designate the smaller montane form with 17 scale-rows as *Natrix olivacea uluguruensis*.

On the single example of the Olive Water Snake known from Pemba Island, however, there are only 15 scale-rows. As several mainland reptiles have distinctive races or representatives occurring on Pemba, I depart from my usual practice and designate this insular race *Natrix olivacea pembana* on the basis of a single specimen. It should be remembered that Pemba, unlike Zanzibar, is separated from the mainland by a channel of exceptional depth—400 fathoms; eight times the depth of the channel between Zanzibar and the adjacent coast.

The three forms of the Olive Water Snakes may be defined as follows:

Midbody scales usually in 19 longitudinal rows

(17 rows in only 1 specimen of 94 examined).

Tropical and South Africa *o. olivacea*

Midbody scales usually in 17 longitudinal rows (19

rows in only 7 specimens of 63 examined).

Uluguru, Usambara and Rungwe Mtns., Tanganyika. *o. uluguruensis*

Midbody scales in 15 longitudinal rows (only the type

specimen known.) Pemba Island *o. pembana*

NATRIX OLIVACEA ULUGURUENSIS subsp. nov.

Natrix olivaceus (part) Barbour & Loveridge, 1928, Mem. Mus. Comp. Zoöl., 50, p. 109; (part) Loveridge, 1933, Bull. Mus. Comp. Zoöl., 74, p. 231.

Type. Museum of Comparative Zoölogy, No. 23,117. An adult ♀ from Nyange, Uluguru Mountains, Tanganyika Territory, collected by Arthur Loveridge, October 8, 1926.

Paratypes. Sixty-one specimens from various localities in the Uluguru, Usambara and Rungwe Mountains as listed in the citations given above.

Description. Scales in 19 rows on nape immediately behind head, 17 rows at midbody, 17 rows at anus; ventrals 136; anal divided; subcaudals 74; labials 8, 4th and 5th entering the orbit; preocular 1; postoculars 3; temporals 1 + 2.

Measurements. Total length 350 (250 + 100) mm.

Remarks. This montane race attains smaller dimensions and lays fewer eggs than the typical form of the lowlands. See citations for further details.

NATRIX OLIVACEA PEMBANA subsp. nov.

Natrix olivacea (part) Loveridge, 1925, Proc. Zoöl. Soc. London, p. 71.

Holotype. Museum of Comparative Zoölogy, No. 19,112. A ♀ from Chakechake, Pemba Island, Tanganyika Territory, collected by Salimu bin Asmani, October 6, 1923.

Description. Scales in 17 rows on nape, 15 rows at midbody, 15 rows at anus; ventrals 127; anal divided; subcaudals 56; labials 8, 4th and 5th entering the orbit; preoculars 2; postoculars 3; temporals 1 + 2.

Measurements. Total length 288 (210 + 78) mm.

Remarks. This snake is discussed in detail in the citation given above.

CORONELLA SEMIORNATA FUSCOROSEA subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,555. An adult ♂ from the lower slopes of Mount Mbololo, Taita, Coast Province, Kenya Colony, collected by Arthur Loveridge, April 25, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,556-7, being two females with the same data as the type. No. 40,554, a juvenile from near the station at Tsavo, Coast Province, Kenya Colony.

Diagnosis. The following key emphasizes the distinguishing characters of the new form.

Labials 8, 4th and 5th entering the orbit¹; preoculars 1, very rarely 2; olive or plumbeous above, white below usually each ventral scale so heavily edged with black as to present a plumbeous appearance *s. semiornata*
Labials 9, 5th and 6th entering the orbit; preoculars 2, rarely 1; bright brownish pink above, clear pink below. *s. fuscorosea*

Description. Snout not prominent, rostral much broader than deep; internasals as long as the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal longer than deep (adults) or as long as deep (young); preoculars 2 (1 on left side of head in Nos. 40,554-5) the upper in contact with (or separated from) the frontal; postoculars 2; temporals 2+ 2 (2 + 3 on left side of head in No. 40,554); upper labials 9, the 5th and 6th entering the orbit; four lower labials in contact with the anterior chin-shields,

¹This was the case in *C. scheffleri* Sternfeld from Kibwezi, which is a synonym of *C. s. semiornata* for they agree in all respects. A topotype of *scheffleri* (M.C.Z. 40,553), however, has 9 upper labials, 5th and 6th entering the orbit on the left side of the head only, 2 preoculars on the right. This is the only intermediate in a very large series, or records, of *semiornata* examined.

which are as long (or longer) than the ill-developed posterior pair. Midbody scales in 21 rows; ventrals 181 (183-198 in paratypes); anal divided; subcaudals 96 (82-92 in paratypes).

Coloration. Above, uniformly bright brownish pink except for an ill defined dusky bar from the 5th and 6th labials across the frontal, a distinct one from the 8th and 9th labials across the parietals, and a well-defined, though shorter, one on the nape at a distance of 6 (or 5) scale-rows behind the parietals. Below, uniformly pink.

The paratype young one exhibits 64 faint bars or paired spots along the back.

Measurements. Type ♂. Head and body 472 mm., tail 186 mm. Paratype ♀ (M.C.Z. 40,556). Head and body 500 mm., tail 150 mm.

APARALLACTUS TURNERI sp. nov.

Type. Museum of Comparative Zoölogy, No. 30,117. A ♂ from Sokoki Forest, near Malindi, Coast Province, Kenya Colony, collected by H. J. Allen Turner, Esq., in June, 1932.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,120-4 being five snakes from Peccatoni; Mkonumbi; and near Witu. All these localities being in Coast Province, north of the Tana River, south of Lamu Island and near the coast. Collected by Arthur Loveridge, May 24, 28, and 31, 1934 respectively.

Diagnosis. Very closely related to *A. werneri* Boulenger of the Usambara and Uluguru Mountains, Tanganyika Territory. It may be readily distinguished from that species by the fewer ventrals (120-139 as against 141-163 in *werneri*, the latter figures being based on scale counts of fifty specimens from seven localities, forty-three of the snakes are topotypes), different coloration, much smaller size (202 mm. maximum as against 354 mm. maximum).

Description. Diameter of eye greater than its distance from the oral margin; rostral twice as broad as deep, the portion visible from above not more than one-third its distance from the frontal; internasals much shorter than the prefrontals; frontal once and a half as long as broad, much longer than its distance from the end of the snout, as long as the parietals; nasal entire, in contact with the preocular; a single (a pair in all paratypes) postocular in contact with the anterior temporal; temporals 1 + 1; 6 upper labials, second and third entering the orbit; first lower labial in contact with its fellow behind the symphysial (barely in contact in No. 40,124); two pairs of chin shields, the anterior broader and a little longer and in contact with three lower

labials. Scales in 15 rows; ventrals 129 (120-139 in paratypes); anal entire; subcaudals 42 (31-37 in paratypes).

Coloration in alcohol. Above, head and nape black except for white blotches, one anterior, one posterior, to the eye, the second blotch larger and extending upwards on to the anterior temporal; also a narrow white color just posterior to the parietals so separating the black of the head from the black of the nape (in all paratypes there are vestigial indications of a second light color immediately posterior to the black of the nape); back uniformly pallid, slightly pinkish, brown with the edges of each scale darker (in all paratypes there is a fine, hair-like, black line along the vertebral row of scales to the end of the tail). Below, uniformly white except for a slight encroachment of the black nape patch in two downward-pointing patches.

Measurements. Type ♂. Head and body 140 mm., tail 35 mm. Largest specimen (M.C.Z. 40,120) also a ♂, head and body 167 mm., tail 35 mm.

AGAMA AGAMA KAIMOSAE subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,136. A ♂ from rocky heights three miles west of the Friends' Africa Mission Station at Kaimosi, Kakamega, Kenya Colony, collected by Arthur Loveridge, March 2, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,137-40,150 and four unnumbered duplicates, being seven males and eleven females taken at the same locality as the type on March 2-9, 1934.

Diagnosis. Most nearly related to *A. a caudospina* Meek with a cotype of which it has been compared. It agrees with that race in the greatly depressed body and numerous other characters, but differs in the less developed spinosity of the tail and its bright pink color (yellow in *caudospina*) as well as in general coloration.

Midbody scale-rows 86 (range in paratype males 76-86, with an average of 81; in females 78-88, with an average of 83); preanal pores 11 (range 10-13, with an average of 11 for the eight males).

Coloration in life. ♂. Above, snout and crown of head brown overlying red; nape, back and two-thirds of upper arm, reddish buff with grey vermiculations; rest of arm and whole of hind limbs a brilliant, somewhat metallic, purplish blue; tail bright pink. Below, edge of jaws grayish white; throat dull red with purplish-mauve tones overlying gray vermiculations; breast pinkish purple; abdomen dull purple overlaid with brown; whole of undersurface of limbs bright

purplish blue; palms of hands as well as soles of feet and digits, grayish white; tail bright pink.

♀. Above, gray with irregular sepia brown markings along the vertebral line; plumbeous on limbs and sides. Below, throat grayish-white with gray vermiculations; limbs grayish-white except base of hind legs which are mustard yellow, as are the abdomen and underside of tail.

Measurements. Type ♂. Head and body 144 mm., tail 211 mm. Largest perfect paratype ♀. Head and body 113 mm., tail 152 mm. The largest ♂ and ♀ measure 148 and 133 mm. respectively in length from snout to anus but the tails of both specimens are truncated as is the case with more than half of the series.

RIOPA TANAE sp. nov.

Type. Museum of Comparative Zoölogy, No. 40,251. An adult ♀ from Kau, near the mouth of the Tana River, Coast Province, Kenya Colony, collected by Arthur Loveridge, June 4, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,252-9 and six others all with the same data as the type; No. 40,261 from near Witu, just north of Kau; Nos. 40,262-3 from Golbanti, Tana River above Kau; Nos. 40,264-5 from Ngatana, Tana River above Golbanti.

Diagnosis. A very slender, attenuated species with small, pentadactyle limbs, the hind limb being included from $3\frac{1}{4}$ (young) to 6 (adult) times in the distance between the axilla and groin. A pair of supranasals form a suture separating the rostral from the frontonasal, nostril in a single nasal which forms a horizontal suture with the supranasal. Midbody scales smooth, in 22 to 24 rows.

Description. Snout but slightly depressed, not wedge-shaped as in *sundevallii* from the same region. Nostril in a single nasal which is separated from its fellow by a pair of supranasals; frontonasal broader than long; prefrontals present, widely separated; frontal as long (slightly longer and slightly shorter in some paratypes) as the frontoparietals and interparietal together, in contact with the 1st and 2nd supraoculars; parietals in contact behind the interparietal and each bordered along its posterior edge by 2 (left), 3 (right) or 4 (some paratypes) large scales; supraoculars 4; supraciliaries 8 (usually 7, rarely 6); loreals 2; preoculars 2; lower eyelid with a large, undivided opaque disk; upper labials 7 (8 in No. 40,253), 5th largest and below the eye (6th in No. 40,253 and on one side only in two others); ear-opening small, round, no larger than the nostril. Limbs very short,

pentadactyle, the adpressed anterior limb just reaching the ear (in adult and young); the length of the posterior limb is contained 6 times ($3\frac{1}{4}$ in young, the proportion varying regularly with age) in the distance between the axilla and groin. Fingers short, the 3rd a trifle longer than the 4th; toes short, the 4th a trifle longer than the 3rd (equal to, or shorter than, in some paratypes), the 5th extending as far forward as the 2nd, further than the 1st; 10 (or 9) lamellae beneath the 4th toe. Scales smooth, in 22 (or 24) rows; preanals 3, slightly enlarged.

Coloration in alcohol. Above, uniformly plumbeus, upper labials flecked with lighter; between the head and fore limb frequently several scales with light flecks (in life these were pale green and so arranged as to give the impression of vertical barring on the neck; only adult skinks, and not all of these, possess this barring). Below, throat and lower labials white heavily spotted with dark brown; belly grayish white but each scale with a dark spot; tail almost plumbeus as a result of the increase in size of these spots. (In some paratypes the spots on the belly and tail are arranged along the lateral edges of the scales so as to produce the appearance of 8 longitudinal lines along the underside from hind chin to anus).

Measurements. Type ♀. Head and body 89 mm., tail 58 mm., hind limb 11 mm., fourth toe 3 mm.

¹ *RIOPA MABUIIFORMIS* sp. nov.

Type. Museum of Comparative Zoölogy, No. 40,266. An adult ♂ from Ngatana, Tana River, Coast Province, Kenya Colony, collected by Arthur Loveridge, June 14, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,267-71 and five others with same data as type but collected June 14-19, 1934.

Diagnosis. A very large Mabuiia-like species with well developed pentadactyle limbs, the hind limb being included from 2 (young) to 3 (adult) times in the distance between the axilla and groin. A pair of supranasals form a suture separating the rostral from the fronto-nasal, nostril so large as to nearly divide the single nasal shield, latter forming a horizontal suture with the supranasal. Midbody scales smooth, in 28 to 30 rows. Color of adults and young different.

Description. Snout neither depressed nor wedge-shaped. Nostril in a single nasal which is separated from its fellow by a pair of supranasals; frontonasal broader than long; prefrontals present, widely

¹ Note. This species differs from *Riopa* as defined by Boulenger in that the frontal is decidedly broader than the supraocular region.

separated; frontal *decidedly broader than the supraocular region*, as long as the frontoparietals and interparietal together, in contact with the 1st and 2nd supraoculars; parietals in contact behind the interparietal and each bordered along its posterior edge by 3 or 4 large scales; supraoculars 4 (5 on one side of No. 40,268 by subdivision); supraciliaries 8 (7 in seven paratypes); loreals 2; preoculars 2; lower eyelid with a large, opaque disk; upper labials 7, 5th largest and below the eye; ear-opening large with two small rounded lobules on its anterior border. Limbs well developed, pentadactyle, the adpressed anterior limb reaching well beyond the ear (in adult and young); the length of the posterior limb is contained 3 times (2 in young) in the distance between axilla and groin. Fingers long, the 3rd a trifle longer than the 4th; toes moderately long, the 4th longer than the 3rd by a claw length (in whole series), the 5th extending as far forward as the 3rd, much further than the 1st; 16 (or 15) lamellae beneath the 4th toe. Scales smooth, in 30 (or 28) rows; preanals with a median pair slightly enlarged.

Coloration in life. ♂ and ♀ adults. Above, uniformly plumbeous but on closer inspection each scale is seen to be lighter at its base, the light area tends to increase in size towards the tail so that the scales on the tail are light centered with dark edges; both upper and lower labials white, each barred with brown or black posteriorly; scales on the sides white, heavily edged with black on their posterior border. Below, uniformly white.

Young. Above, black, crown of head mottled with pale brown, occipital scale conspicuously white with dark centre; a vertebral stripe of pale brown, one scale in width, commences behind occipital scale and continues on to base of tail where it disappears, the vertebral stripe is flanked on either side by a dorso-lateral stripe of same color but two scales in width and commencing at the last supraocular; limbs uniformly black; tail transparent red, each scale edged with brown. Below, pure white, the internal organs visible through the scales; tail clear coral pink.

Measurements. Type ♂ and ♀. Head and body 95 and 91 mm., tail 141 and 121 mm., hind limb 22 and 20 mm., fourth toe 65 and 64 mm.

ACONTIAS PERCIVALI sp. nov.

Acontias meleagris Loveridge (not of Linné), 1923, Proc. Zoöl. Soc. London, p. 964.

Type. Museum of Comparative Zoölogy, No. 40,174. An adult ♀

(largest of forty) from the foot of Mount Mbololo, Taita Mountains, Kenya Colony, collected by Arthur Loveridge, April 26, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,175-40,200 being thirty-eight specimens with the same data as the type. Also Museum of Comparative Zoölogy, Nos. 31,079-31,080 and three skins in the Coryndon Memorial Museum, Nairobi, collected at Voi near Mount Mbololo, by A. Blayney Percival in 1914.

Diagnosis. Only separable from *meleagris* (Linné) of South Africa by its shorter tail and coloration. According to Boulenger (1887, Cat. Snakes Brit. Mus., 3, p. 427) the tail of *meleagris* is "not more than one fifth of the total," it is included 6.1 to 6.3 times in the total length in examples from the Transvaal and Orange River Colony in the Museum of Comparative Zoölogy. In forty examples of *percevali* it ranges from 8.4 to 10 times (average exactly 9). In alcohol *percevali* has a very broad dorsal band of deep black while below it is pure white; there is no dark spot on each scale resulting in a lineolate or gray appearance as in *meleagris*.

It is important to note that the key character used by Boulenger to separate *meleagris* and *plumbeus* of Mozambique is inconstant though the two species are very distinct. In *percevali* about 25 specimens have the first supraocular larger than the second and third together, in 13 specimens it is equal to, in 3 possibly smaller. In the Museum of Comparative Zoölogy examples of *plumbeus* the first supraocular is as large as, or smaller than, the other two; in our *meleagris* it is as large as, or much larger than, the other two.

The range of *meleagris* is separated by 1,500 miles from that of *percevali*.

Description. Head conical; snout obtuse, projecting; ear hidden; rostral enormous, covering the greater part of the snout; mental enormous, its posterior border reaching to below the eye; frontonasal hardly half as long as the rostral, much shorter than the frontal, which is broader than long; supraoculars 3, the first much larger than the two others together (equal to the two others occasionally); supraciliaries 4 (on right) or 3 (on left); interparietal much narrower than the frontal, longer than broad (sometimes as broad as long), narrower than the parietals (rarely as broad as); no labials enter the orbit. Midbody scale-rows 18 (16, 17 or 18 in paratypes, average for forty-two skins 17.5) those of the two median dorsal rows transversely enlarged. A single, very large preanal plate. Limbs absent. Length of tail included 9.6 times in total length (8.4 to 10 times in paratypes).

Coloration in life. Both adults and young are glossy black above

except when about to shed the epidermis. At such times they are bluish gray above, a delicate pink below. Normally the young are reddish orange below, this shade sometimes persisting until they are two-thirds grown. Adults are pale chrome below; very occasionally an individual will be found with a brown centre to each lower scale resulting in the production of a faintly lineolate appearance. For coloration in alcohol see diagnosis above.

Measurements. Type ♀. Head and body 234 mm., tail 27 mm.

CHAMAELEON BITAENIATUS ALTAEEELGONIS subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,274. An adult ♂ from Kaburomi, 10,500 feet, on the western slopes of Mount Elgon, Uganda, collected by Arthur Loveridge, December 28, 1933.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,275-40,300, being twenty one males and thirty females with the same data as the type.

Diagnosis. Most closely related to *C. b. höhnchi*, from which it is distinguished only by its smaller size. See remarks below.

Measurements. Type ♂. Head and body 78 mm., tail 73 mm. M.C.Z. 40,275, Paratype ♀. Head and body 75 mm., tail 73 mm.

Remarks. Kaburomi lies in the tree heath (*Erica arborea*) zone immediately below the alpine zone of Mount Elgon. On reaching it, I was immediately struck by the small size and different coloring of the chameleons as compared with those with which I was familiar at Sipi (circa 6,500 feet) and of which I had a good series, collected during the three weeks stay at Sipi.

Almost all our specimens from both places were adult and breeding. A tabulation of their measurements by sexes immediately shows that at Kaburomi these chameleons attain to about three-quarters the size which they do at lower levels.

Largest of 22 males from Kaburomi	151 mm.
Largest of 22 males from Sipi	199 mm.
Largest of 30 females from Kaburomi	148 mm.
Largest of 30 females from Sipi	190 mm.

The explanation is doubtless to be found in the relative scarcity of insect life at the higher altitude coupled with the fewer hours for feeding. For we observed at 10,500 feet it was so cold that reptiles remained lethargic or sluggish until about 11 a.m. by which time the sun had dispersed the mist and warmed the atmosphere. The difference

in coloring was attributable to the altered character of the vegetation and different tones of color resulting therefrom.

Woosnam (in Boulenger, 1909, Trans. Zoöl. Soc. London, **19**, p. 245) noted a similar difference between the chameleons at 6,000 and 10,000 feet on Mount Ruwenzori. Speciation had gone further in this instance and Boulenger gave the upper zone form a name. It is now known as *C. b. rudis*, but is very different from the Elgon races. Parker (1932, Linn. Soc. Journ. Zoöl., **38**, pp. 227-9) refers the upper zone form from Mount Kenya at 14,000 feet to *C. b. schubotzi* Sternfeld, discusses the derivations of some of the races of *bitaeniatus* and figures them.

BOULENGERULA TAITANUS sp. nov.

Type. Museum of Comparative Zoölogy, No. 20,001. An adult ♂ from the absolute summit, 4,800 feet, of Mount Mbololo, Taita Mountains, Coast Province, Kenya Colony, collected by Arthur Loveridge, April 14, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 20,002-20,024, being twenty nine caecilians with the same data as the type except that they were taken from 4,000 feet to 4,800 feet and between April 14 and 24, 1934.

Diagnosis. In its large size and coloration resembling a *Scolecormorphus* and totally unlike *Boulengerula* with which, however, it agrees in structural characters, possessing two rows of teeth in the lower jaw and a lateral tentacle situated above, and about midway along, the upper jaw.

Intermediate in number of annuli between *B. uluguruensis* Barbour & Loveridge and *B. changamwensis* Loveridge, agreeing with the former in the number of annuli but differing in that the tentacle is slightly nearer to the nostril than to the corner of the mouth, in *uluguruensis* this position is reversed. *B. taitanus* differs from *changamwensis* both in number of annuli and in position of the tentacle. It differs from both in size and coloration. The young, however, agree in color.

Description. Habit moderate, vermiform. Snout obtusely pointed, projecting far beyond the lower jaw; eye indistinguishable; tentacle round, exsertile, with indications of a circular groove surrounding it, situated rather nearer to the nostril than to the corner of the mouth; 26 or 28 teeth round the upper jaw; 146 annuli (136-148 in the paratype series), these annuli are interrupted in the middle dorsal line except on the nape and posteriorly.

Coloration in life. Type ♂. Above, glossy black, each annular ring blue gray except along the vertebral line. Below, blue gray blotched with brown, except for the throat which is uniformly pink; the circumanal area is pale blue gray.

Very young specimens are flesh pink like adults of *changamwensis*. Immediately after being chloroformed they turn gray above, but remain pink below.

Coloration in alcohol. Type ♂. Generally plumbeous but the gray blue and pink areas become white.

Measurements. Type ♂. Total length 355 mm., midbody diameter 7 mm. Paratypes. Total lengths 73-360 mm., midbody diameters 1.8-7 mm. Diameters included in total lengths from 40.5 to 53.3 times.

ARTHROLEPTIDES DUTOITI sp. nov.

Type. Museum of Comparative Zoölogy, No. 19,864. An adult, gravid ♀ from the Koitobos (Koitobross) River, eastern slopes of Mount Elgon, Kenya Colony at about 7,200 feet, collected by Dr. A. C. du Toit, January 8, 1934.

Paratypes. No. 150 of du Toit collection. An adult ♂ and young specimen with the same history as the type.

Diagnosis. This very distinct little frog may be readily distinguished from the only other member of this hitherto monotypic genus as follows:

Toes half-webbed; buccal margin scarcely flattened, the orbits projecting beyond it when viewed from above. Color below, light violet brown slightly or moderately flecked with white. Adult ♀ 31 mm. *dutoiti*

Toes with only a rudiment of web at their base; buccal margin strongly flattened, extending well beyond the orbits when viewed from above. Color below, white, at most the throat violet brown in males. Adult ♀ 59 mm., ♂ 74 mm. *martiensseni*

Description. Vomerine teeth absent. Head slightly broader than long; snout subacuminate, not depressed as in *martiensseni*; canthus rostralis sharply defined; loreal region concave; nostril equidistant between end of snout and anterior border of orbit; tympanum distinct, not quite two-thirds the diameter of the eye; interorbital space about equal to the width of an upper eyelid. Tips of fingers and toes strongly dilated, the disks having a median groove; digits without web; toes

half-webbed the membrane extending as a narrow fringe to the disk of the 1st, 2nd and 5th toes on their inner margin, almost to the disk on the 3rd, the disk and two distal joints of the 4th toe free of web; the tibio-tarsal articulation of the adpressed hind limb reaches slightly beyond the tip of the snout (well beyond in the ♂).

Skin above rugose (corrugated and distinctly warty in the ♂) pitted. In *martiensseni* the skin is smooth, how far preservation may have accentuated these differences it is difficult to say.

Coloration in alcohol. (After formalin preservation in the field). Above, uniformly black except for the digital expansions which are more or less white-edged. Below and posterior aspect of thighs, light violet brown slightly flecked with white in the type, rather more abundantly flecked and mottled in the paratypes.

<i>Measurements.</i>	♀ Type	♂ Paratype	Young Paratype
Length from snout to anus	31 mm.	25 mm.	10.5 mm.
Breadth of head	12.5 mm.	10.5 mm.	4.5 mm.
Length of head	10.5 mm.	9 mm.	4 mm.
Length of hind limb	59 mm.	50 mm.	15.5 mm.
Length of fourth toe	13.5 mm.	11.5 mm.	3.5 mm.

HYPEROLIUS MILNEI sp. nov.

Type. Museum of Comparative Zoölogy, No. 20,025. A gravid ♀ from Witu, Coast Province, Kenya Colony, collected by Arthur Loveridge, May 31, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 20,026-20,050 being seventy-four frogs with the same data as the type. Nos. 20,051-2 from Golbanti, Tana River and No. 20,053 from Malindi, all near the coast in Coast Province, Kenya Colony.

Description. A small species of stouter build than its allies of the *parkeri-usaramoae* group. Snout obtusely acuminate (not sharply pointed); distance from the end of the snout to the nostril equal to two-thirds the distance from nostril to anterior border of the eye; distance from the end of the snout to the anterior border of the eye longer than the orbital diameter; tympanum hidden. Fingers one-third webbed; 1st, 2nd, 3rd and 5th toes are webbed to the disk (or practically to the disk) on their inner aspect, on the 4th toe the disk and last two phalanges are free of web. The tibiotarsal articulation of the adpressed hind limb reaches to the eye (in females, to the nostril in only one female) or to the nostril (in males, very occasionally falls

short). Skin smooth above, granular on the belly, no strong fold across the chest. Males with a large subgular vocal sack and strongly granular disk.

Coloration in alcohol. Above, white, a dusky line from end of snout through nostril to orbit, a black spot on upper eyelid, half-a-dozen scattered, irregularly disposed, black spots on anterior portion of back (maximum number of spots about 20 in Malindi paratype; these spots are entirely absent in many paratypes, principally males), a similar spot on knee and elbow (often absent); in addition there are numerous, minute, reddish-brown flecks on top of head, back, fore arm and tibia; thighs colorless. Below, transparently white, internal organs visible through the skin.

Coloration in life. Above, an unusual shade of cabbage green, a black canthal line through nostril to orbit, a number of irregularly disposed, black spots on head and back in addition to numerous reddish-brown flecks on top of head, back, fore arm and tibia; thighs colorless; a broad, but indistinct, subdermal band of palest yellow from eye to flank present in males but not observed in females; fingers and toes orange. Below, semi-transparent, throat greenish in ♀, the eggs and internal organs showing distinctly, intestines imparting a greenish tinge to the sides; throat and breast pure white in ♂ with a certain amount of green or greenish blue periphally.

	♀	♂
<i>Measurements</i>	M.C.Z. 20,025	M.C.Z. 20,026
Length from snout to anus	20 mm.	21.5 mm.
Breadth of head	7 mm.	7.25 mm.
Length of head	7 mm.	7.25 mm.
Length of hind limb	30 mm.	31 mm.
Length of fourth toe	6 mm.	6.5 mm.